

West 55th Street and West 56th Street Piers
(Piers 95 and 96, North River)
On the Hudson River, in line with the ends of
West 55th Street and West 56th Street
Borough of Manhattan
New York County
New York

HAER No. NY-147

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
MID-ATLANTIC REGION, NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR
PHILADELPHIA, PENNSYLVANIA 19106

HISTORIC AMERICAN ENGINEERING RECORD

WEST 55th STREET AND WEST 56th STREET PIERS

(Piers 95 and 96, North River)

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Location: On the Hudson River, in line with the ends of West 55th Street and West 56th Street, Borough of Manhattan, New York County, New York

USGS Quadrangle: Central Park
UTM Coordinates: 18.584600.4513600 (West 55th Street)
18.584640.4513670 (West 56th Street)

Date of Construction: 1915-17; modified c1930-32, 1937-39, 1942, 1949, 1953, 1962

Engineers: Charles W. Staniford, Chief Engineer, New York City Department of Docks and Ferries;
T.F. Keller, Assistant Engineer, New York City Department of Docks and Ferries;
M. Lenke, Assistant Engineer, New York City Department of Docks and Ferries (suggestion for design of hinged cargo beams at West 55th Street Pier)

Original Contractors: West 55th Street Pier
Pennsylvania Steel Company, Steelton, PA (fabrication of piershed and bulkhead shed);
Snare & Trieste Company, New York, NY (partial reconstruction of pier, and erection of sheds);
William J. Olvaney, New York, NY (heating system installation);
Thomas E. O'Brien Bros., New York, NY (plumbing)

West 56th Street Pier
Pennsylvania Steel Company, Steelton, PA (fabrication and erection of piershed and bulkhead shed);
Teran, Mahoney, & Monroe, New York, NY (heating system installation);
J.S. Murphy, New York, NY (plumbing)

Present Owner: New York City Department of Ports, International Trade and Commerce
Battery Maritime Building
New York, NY 10004

Present Occupant and Use: New York City Department of Sanitation, for storage of equipment and road salt on the paved area between the piers and 12th Avenue, and for transfer of garbage from collection to transport vehicles

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Significance:

The piers at West 55th and West 56th streets are important and rare remains of historic transatlantic commerce in the Port of New York, being two of only three municipal piers built for this traffic which survive with relatively undisturbed original fabric. Between 1897 and 1936, the City of New York built four terminals with twenty-two piers on the Hudson River to accommodate the growing size of ships and retain the port's traditional dominance in the liner trade. Together with the recently-demolished West 57th Street Pier superstructures, the two piers formed the third and most northerly of the four terminals. Completely rebuilt c1914-17 from older piers, the three piers followed the Gansevoort and Chelsea piers of 1897-1908, and generally predated the terminal completed in 1936 between 44th and 52nd streets. Typical of municipal and some private pier and pierhead construction during the period 1910-1925, the piers from 55th to 57th streets also featured bulkhead sheds joining the pierheads and presenting a unified street facade. Similar in general architectural design to the bulkhead sheds of the Gansevoort and Chelsea piers, these three piers were somewhat transitional in using facade materials and proportions similar to those of the later liner piers just to the south, which substituted four-bay headhouses for bulkhead sheds. The 55th Street Pier is also of historic engineering interest for its early use of hinged cargo beam design, to relieve stress on cargo mast systems. Following terminal completion, Furness, Withy & Co., Ltd. and Navigazione Generale Italiana (Italia) were the principal liner tenants for five decades, until airline and container traffic largely eliminated Port of New York liner traffic during the 1960s. Together with Pier 54 in the Chelsea Section, the West 55th and West 56th street piers stand today as mute witnesses to the heyday of the 20th century liner trade.

Project Information: Prepared in April and May 1986 for the New York City Department of Ports, International Commerce and Trade, this documentation mitigated anticipated adverse effects on the two piers by their 1986 demolition for a concrete batching plant.

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Part I: Historical Information

Port of New York Transatlantic Passenger Liners and Municipal Infrastructure

The Port of New York's premier position in American trade with Europe, first established after the War of 1812, soon made it a center of transatlantic passenger ship traffic. With the beginnings of regular steamship service in the late 1840s, liner companies with larger ships shifted the center of transatlantic commerce at New York from the East River to the Hudson (North River). The number of companies increased dramatically after 1865, as British and other European lines became the dominant carriers, creating more demand for facilities on Manhattan's Lower West Side. By this time, however, the waterfront favored by the liners was a morass of congested, inadequate facilities which threatened to diminish New York City's trade in favor of neighboring Brooklyn and Jersey City. Much of Manhattan's waterfront had passed into private hands through sales of water lots before 1844. The growth of railroad terminals on both sides of the Hudson, with increased waterfront devoted to lighterage and car transfer, and the dispersed, ineffective city administration and policing of public or private waterfront facilities, discouraged development of better liner piers. Following a thorough reassessment of city waterfront management and conditions in 1867-68, the Department of Docks emerged in 1870 as the central municipal agency for waterfront planning, financial administration, and construction. A comprehensive plan prepared under former General George McClellan called for 250-foot-wide, bulkheaded marginal streets, wooden pile piers 400-500 feet long and 60-80 feet wide, and slips between piers 150-200 feet wide. The city under this plan slowly re-acquired most of the Manhattan waterfront, and built new bulkheads, built or rebuilt pier substructures, with leasing of the new facilities to private parties who were responsible for making any superstructural improvements. New private pier construction had to meet Department of Docks standards as well (State of New York 1864; City of New York 1868; van Buren 1874; Hoag 1905; Albion 1939; Moehring 1976).

Financial limitations following the 1873 Panic, as well as time spent developing standard pier and bulkhead designs, delayed virtually all new municipal waterfront improvements until the late 1870s, with little if any work done on the North River above 34th Street until the 1880s. Most sustained municipal North River activity concentrated on the more commercially important waterfront south of West 11th Street, where the passenger ship traffic predominated to about Canal Street. During the first decades of centralized municipal waterfront planning, the pier lengths prescribed in 1868 and suited to the largest ships remained adequate for liner traffic. By the 1890s, however, maximum liner lengths were approaching 700 feet, as steel shipbuilding advances and the pursuit of company or national prestige led to longer and longer vessels which reached 1000 feet by the mid 1930s. Between 1897 and 1936, the Department of Docks (by then the Department of Docks and Ferries) engaged in a sustained race against this trend, working to accommodate both ship lengths and the limits of the federally mandated pierhead lines in the North River.

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The Department of Docks completed four passenger ship terminals during this period: five piers at least 700 feet long and 75-125 feet wide in the Gansevoort Section (1897-98); nine piers at least 825 feet long and 60-120 feet wide in the adjacent Chelsea Section to the north (1902-08); three piers from West 55th to West 57th streets, 700 feet long and 60-110 feet wide (1915-17); and five piers 950-1100 feet long and about 135 feet wide between West 44th and West 52nd streets (1915-36). All but the third terminal involved excavation into the upland to achieve greater pier length, and the construction of completely new substructures. The terminal including the surviving piers at West 55th and West 56th streets was somewhat anomalous in this sequence, in that the city here rebuilt three older piers without upland excavation, to accommodate not the longest or potentially longest passenger ships but somewhat smaller transatlantic vessels such as those serving the Mediterranean. Although the Department of Docks studied the possibility of building an array of piers, 1000 to 1500 feet long, between West 38th and West 57th streets as early as 1912, the contraction in liner traffic during World War I may have tempered these plans. Only one of the longer piers envisioned at this time soon emerged, at West 46th Street (1915-18), with the other four eventually built for the new Transatlantic Steamship Terminal not begun before 1925 (City of New York 1900-1940).

Department of Docks engineers designed all of the municipal liner piers, following evolving substructure and superstructure plans which they developed c1870-1915. All twenty-two piers had heavily-braced wooden pile substructures, standardized by the department before 1880. The Gansevoort piers had the traditional wooden decks (probably on the second stories of the sheds as well), but during Chelsea pier construction the department began replacing part of the wooden decks with concrete. After successfully introducing a composite design with wood piles and all-concrete deck in South Brooklyn in 1909, department engineers used this pattern (described in Part II) for all subsequent liner piers. All superstructures were steel framed and generally covered with galvanized metal, with other materials used on street facades beginning with the Chelsea piers. Most superstructures had two stories, including all pier sheds except the one at West 56th Street. Such superstructures were unusual in the Port of New York, where timber framing had prevailed, at the time of Gansevoort pier construction. The plate girder supports for the second stories added weight and cost, but also provided some fire protection. The steel framed form quickly became common in the port after the turn of the century (Staniford 1914; Raber, Flagg, Wiegand and Antici 1984: 77-83).

The municipal liner piers had several distinctive plan and engineering features, some of which also proved important influences on other private or public waterfront projects. The first three terminals completed had bulkhead sheds joining the inshore pier ends and forming continuous street facades, with each pier associated with a bulkhead shed running half the width of each adjacent slip. Although perhaps derived from earlier ferry terminal designs in the port, the bulkhead sheds allowed for some separation of the passenger service and general cargo handling which characterized most transatlantic passenger traffic. The bulkhead sheds often had elevators, stairs, and conveyors or escalators for passengers and baggage, leaving the pier sheds open for storage and handling of general cargo. Such sheds were not common at general cargo or lighterage piers. Cargo doors in continuous

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piershed bays allowed for easier movements between piers and ships too long to be moved within a slip after mooring. Unlike the bulkhead sheds, the continuous cargo doors, and the rigid cargo mast systems of steel columns and beams which first appeared at the Chelsea piers and contemporary North German Lloyd terminal in Hoboken, became common at two-story general cargo piers in the port by World War I. Most earlier piersheds, apparently including the Gansevoort piers, relied for ship-pier transfers on ship wiches and booms, or included timber or steel masts joined only with cable stays to support hoisting blocks for winch-powered transfers.

Unlike perhaps any other waterfront projects ever built in the port, the liner terminals built by the Department of Docks included both heavily ornamented, primarily sheet metal outshore pier facades, and monumental pierhead and bulkhead shed facades sharply defining street edges. Although the department's conscious or formal involvement in the City Beautiful movement of 1895-1935--with an emphasis on large-scale, uniformly-designed public complexes--remains undocumented, the terminal facades clearly emerge from that trend. Classicized details, with pediments masking structural gable roof trusses, characterized most outshore facades. The Gansevoort and Chelsea terminal street facades were extremely powerful endings to adjacent cross streets, with continuous two-story sheds and higher facades at the pierheads. The earlier project, perhaps built at least in part by the prospective liner company tenants who added varied details, had corrugated iron facades with continuous pilastered bays. In the Chelsea section, where the department contracted directly for all work, the facades are more monumental, eclectically classicized structures of stucco, scored to resemble cut stone and laid over frameworks of steel, concrete, and metal lath on granite bases. Semi-circular arches under pediments mark the main entrances.

Visually, the terminal facade between West 55th and West 57th streets bridges the styles of the Chelsea piers and the last terminal south of 52nd Street. The central arches persisted through the two later projects, but in brick facade walls topped with terracotta tile entablatures, and the bulkhead sheds became less important, lowered to one story at 55th-57th streets and disappearing entirely at the last terminal, where the piers stood individually with four-bay headhouses. Department of Docks planning criteria for the size or use of bulkhead sheds vs. headhouses remains undocumented, though as noted below the inter-terminal facade similarities were planned.

Following completion of the last terminal in 1936, the department made few improvements or additions to the liner facilities during the remaining years of traditional passenger liner traffic, except for sprinkler systems installed in the early 1950s. By the mid 1960s, airline and container ship competition had eliminated nearly all of the transatlantic traffic and most other traditional shipping in Manhattan, leaving a few passenger lines serving the remnants of the Caribbean cruise trade. The city renovated three of the later liner piers at 88th, 90th, and 92nd streets in the early 1970s to serve cruise traffic, under Port of New York Authority management. Earlier attempts to renovate some Chelsea piers for traditional purposes failed, and the city gradually demolished all or parts of most other liner pier in attempts to lease the properties for other purposes, or turned them over to other city agencies for storage or office space. Only three of the twenty-two completed liner piers now retain anything like original integrity: Chelsea Pier 54, and the piers at West 55th and West 56th streets.

Development and Operation of the West 55th-West 57th Street Terminal

Figure 2 shows the principal stages in the development of this site. The Department of Docks gained control of the waterfront encompassing the later terminal between c.1878-91, before which time the shoreline was well east of its present limit. A stream entered the North River around 56th Street, near a small timber crib pier built at 55th Street. Lumber and building materials yards marked the undeveloped, partly refuse-laden shoreline, as the Upper West Side north of about 59th Street entered a sustained period of residential development lasting until World War I. Most local department activity during the pre-war period involved construction of pier facilities serving the burgeoning neighborhood, and of permanent river wall which could serve future commercial shipping interests as part of a marginal street. The department built timber pile piers at 55th and 56th streets c1883-84 and c1891, respectively, and a slightly wider pier at 57th Street c1890, with the present river wall also built in the early 1890s. The 57th Street Pier became part of a Department of Docks repair yard, for the department's large construction and maintenance force, while the two piers to the south served for public wharfage, receipt of building materials, ice, or coal, and for dumping of refuse by contracting companies. Coal companies leased most of the bulkhead space between the piers. None of these uses yielded large rents, and the department made no further improvements to the area until World War I, except to lengthen all three piers to the 1897 federal pierhead line, between c1900 and 1912 (City of New York 1900-1940; Raber, Flagg, Weinstein, Antici, and Wiegand 1986).

Although department plans of c1912 evidently called for building piers of 1000 feet or more in this area, as part of the development of passenger liner terminals from about 38th to 57th streets, final plans completed c1914-15 called instead for rebuilding of the three 700-foot-long piers with concrete decks, piersheds, and bulkhead sheds as a "...terminal for Mediterranean Service..[with] uniform ornamental architectural sheds which will add greatly to the attractiveness of this section of the waterfront and will harmonize with the pier sheds..between 44th and 50th street" (City of New York 1900-1940: 1917, 8-9). Department construction forces rebuilt part of the West 55th Street Pier in 1914 and 1915, and moved the repair yard at 57th Street to St. George, Staten Island, in anticipation of leasing the planned new facilities to shipping companies. After completing lease arrangements with Furness, Withy & Company, Ltd., and Navigazione Generale Italiana (NGI) late in 1915, set to commence upon completion of the new sheds, the department contracted for remaining fabrication and construction tasks at the three piers between January and June of 1916. Contractors completed at least some of the substructure rebuilding, a process described in Part II below, and apparently had the three terminal sections ready for occupancy by the end of 1917. Perhaps because the leases required the tenants to pay for installation of boiler plant, winches, generators, and power machinery, and divided the terminal between Furness Withy at 55th Street and NGI at 56th and 57th streets, most of the construction contracts were based on this spatial division. The department evidently achieved uniformity in structural work as well as design by contracting with the Pennsylvania Steel Company for fabrication of all three sets of superstructures, and construction of the two northern ones, with construction at West 55th Street performed by Snare & Trieste Co. (City of New York 1900-1940, n.d.: 8, 12-17 and 10, 383-87 [unpublished sources]; Pennsylvania Steel Company 1916 [plans]).

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Both leases, for ten-year terms with two possible renewals of similar length, called for the city to pay for all improvements except as noted above, in keeping with development procedures used at least from the time of Chelsea Section construction. Tenants were to pay for any future inshore pier extension requiring excavation, while the department would pay for any outshore pier extension, with additional rents charged on the improvements in either case and all such improvements to revert to the city upon lease expiration or termination. As noted below, NGI elected to make an inshore extension in 1926. The original leases reveal much less revealing tenants rights to furnish accommodations to other lines, noting only NGI's privilege in this regard for its own subsidiaries, although later renewal leases not yet reviewed may be more explicit. Furnishing wharfage and terminal use rights to other lines, at least temporarily, was evidently extremely common practice in the port, as suggested by the incomplete data currently available on the tenants in question (City of New York n.d.: 8, 12-17 and 10, 383-87 [unpublished sources]).

Navigazione Generale Italiana, which began passenger and cargo service to New York in 1881, was the largest of some seven North Atlantic lines operating from Italy by 1910, at which time NGI made subsidiaries of three competitors: La Veloce, Italia, and Lloyd Italiano. In 1918, NGI absorbed Lloyd Italiano to acquire more ships. Before taking over the West 56th and West 57th Street piers, NGI operated from West 34th Street. Through much or all of its tenancy at the new terminal, NGI shared one or both of its piers with the Swedish-American Line under an undocumented arrangement. Although the terminal was not intended for the largest liners planned or in service c1915, NGI success during the early 1920s led to its construction of two liners launched in 1926 which both exceeded the 700-foot-length of its New York piers: **ROMA** and **AUGUSTUS**, the latter being the largest passenger motor liner ever built. To accommodate these ships, NGI demolished part of the West 57th Street bulkhead street and excavated 26 feet of additional inshore bow slip space, lined with a concrete wall, just prior to the first arrival of the **ROMA**. By the early 1930s, anticipated new ships made NGI use of the terminal for transatlantic liners increasingly dubious. Although it was clear after about 1927 that Mussolini wished to consolidate all remaining Italian lines to eliminate competition, NGI and one of its remaining two rivals, Lloyd Sabaudo, both began 800-foot ships under government prodding in 1929. These two ships, **REX** and **CONTE DI SAVOIA**, were seen as Italian prestige projects, and during the first few years after their completion in 1932 were among the five largest ships in the North Atlantic traffic. With Depression effects hurting the competitive Italian lines, and anticipated exacerbation of this problem with the launching of the two new ships, the Italian government oversaw the merger of NGI, Lloyd Sabaudo, and Cosulich into a new Italia line in 1932. Italia remained a tenant at 56th and 57th streets until 1936, although the extent of its actual continued use is unclear, and then moved to one of the larger new piers at West 52nd Street (Photographs 27-28; U.S. Army Corps of Engineers 1926, 1932; City of New York 1900-1940, 1926-76: Manhattan 244; Maxtone-Graham 1972: 258-60; Emmons 1972: 65-6; Bonsor 1979: III, 198-1110 and IV, 1605-21).

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Furness, Withy & Co., Ltd. grew from its beginnings in the 1870s to ownership under various form of numerous shipping lines. The West 55th Street Pier quickly became the center of Furness traffic to Bermuda, a cruise trade the company entered in 1919 and engaged in until 1966, when it closed operations at this terminal. The most prominent vessels serving this terminal were the **QUEEN OF BERMUDA** and the **MONARCH OF BERMUDA**, from the early 1930s until a few years after World War II, which interrupted all transatlantic traffic. During at least part of its first lease, Furness shared the 55th Street facility with Lloyd Sabaudo. Furness lines serving other areas, such as Halifax, Nova Scotia, and St. Johns, were evidently active enough to warrant Furness tenancy of the entire terminal after the 1936 Italia lease expiration. Although formal or informal arrangements with other non-Furness lines are unclear, Grace Lines shared the pier at 55th Street during the late 1930s, and ships from at least Anchor Lines, Holland-America, Swedish-America, Home Lines, the Greek Line, and the Chandris Line appeared at the terminal during the last thirty years of Furness tenancy (Photographs 27-30; World's Maritime News Corporation 1930, 1940; U.S. Army Corps of Engineers 1926, 1932, 1942, 1953, 1965; Kludas 1976: III, 180-82; Bonsor 1979: III, 1020-31; Cummerford n.d.).

Aside from the bow slip built by NGI, and relatively minor interior alterations and exterior repairs, the two principal tenants made no alterations to the terminal during its five decades of active life. Each line supplied and operated its own portable operating equipment, outlined in Part II below, in conjunction with permanent facilities such as cargo masts, elevators, and fixed escalators. For most of its tenancy, Furness, Withy & Co., Ltd. contracted with the Bay Ridge Operating Company for stevedoring services (U.S. Army Corps of Engineers 1942, 1953, 1965).

Twilight Life Following Liner Operations

Unable to find any other tenants or alternative uses for the terminal after 1966, the city ceased maintenance of any kind, shut off most utilities, and used the complex for impounded car storage and refuse transfer/equipment storage by the Department of Sanitation. The piers may also have served as informal living spaces for local homeless people, and as sources of stolen copper.

A Note on Pier Numbers

Most Manhattan piers have had one or more numbers assigned by the Department of Docks. The system currently in use dates from the period of Chelsea pier construction, after which time piers 1-64 extended from Battery Place to West 24th Street, and pier numbers above on the North River derived from adding 40 to the street numbers. Thus, although almost always referred to in original material as piers at West 55th, 56th, and 57th streets, the terminal piers were also known as Piers 95, 96, and 97.

Part II: Descriptive Information

General Character and Condition

When completed c1917, Piers 95, 96, and 97 formed a small steamship terminal, with piers of equal length, visually integrated outshore facades, and continuous bulkhead sheds with uniform architectural treatment. The long inshore facade defined the west side of Twelfth Avenue and the marginal way for the length of three city blocks, fronting an open paved area about 190 feet wide. Construction of additional slip space south of Pier 97 removed the bulkhead shed south of that pier for some 90 feet in 1926, leaving the street facade intact and replacing part of the firewall to the south with cargo doors. By 1937, completion of both the elevated West Side Highway and the Transatlantic Steamship Terminal (44th to 52nd streets) changed the direction, width, and character of Twelfth Avenue at Piers 95-97. Furness, Withy & Co., Ltd. added or altered small storage, office, and shop spaces in the piershed and bulkhead shed interiors during its lease of all three piers after 1936, and added electric signs to all three pier entrances in 1962. The city's Department of Marine and Aviation added sprinkler systems and fire curtains in 1953. After the end of liner traffic at this terminal c1966, municipal use for storage of impounded cars, street cleaning vehicles, and road salt included additional minor alterations of interior bulkhead shed spaces, and removal of most steamship line signage from the street facades. The Department of Sanitation demolished the piershed and northern half of the bulkhead shed at West 57th Street in 1985-86, and rebuilt the Pier 97 substructure.

Removal of Pier 97 truncated the original terminal form. There were especially adverse visual effects on the long inshore facade, already obscured by sanitation trucks and road salt, and burdened since 1937 by contorted spatial and traffic relationships to Twelfth Avenue and streets to the east. Except for some removal or covering of bulkhead shed facade doors and windows, however, surviving exteriors remain largely intact, reflecting original uses, terminal design, and architectural detailing (Photographs 1-10). Piershed and bulkhead shed interiors retain all original and later sheds, offices, and other enclosures, plus some original heating equipment. The interiors retain spaces devoted to passenger movement, longshoremen gathering and timekeeping, cargo or baggage storage and movement, customs procedures, office work, and utility systems, despite some accumulation of debris, removal of most electrical and plumbing fixtures, and deterioration of decorative elements in passenger areas (Photographs 15-25).

Superstructures at Piers 95 and 96 remain in generally good structural condition, except for the neglected roofs (Photograph 10). A recent fire at Pier 96 exacerbated roof deterioration. All cargo doors appear to be inoperable. Substantial deterioration of pier substructures, in some places distorting superstructure framing slightly, led the Department of Ports and Terminals to condemn both piers in 1978 (Photographs 1, 4, 6, 9, and 10; personal communications, Norman Berger and Thaddeus Logan, New York City Department of Ports and Terminals).

Exteriors

Beyond and perpendicular to the masonry bulkhead wall, the substructures of Piers 95 and 96 are each 60 feet wide, and extend west 704.5 and 699.3 feet, respectively. A slip 200 feet wide separates the two piers. Each piershed is some 677.5 by 55 feet in area, with 2.5-foot-wide aprons to the north and south. The two-story Pier 95 piershed has a roof peak 48 feet above the pier deck for 662 feet beyond the bulkhead line, defining a shorter second story fronting an outshore promenade deck, while the one-storied Pier 96 shed is 28 feet high throughout. The piershed roofs and framing continue inland some 46.5 feet as part of the bulkhead sheds, defining the central entrances from the street. Along the bulkhead wall, each of the two 260-foot-long bulkhead sheds includes two 48-foot-wide wings with shed roofs sloping outshore from 20-foot-high summits, running perpendicular to the higher central section about 100 feet in each direction. The bulkhead sheds join at a common firewall, with the Pier 96 shed similarly meeting the remains of the Pier 97 shed. The latter structure, built around its 110-foot-wide pier, originally extended a total of about 310 feet along the street, so that the original inshore terminal facade extended some 830 feet (Figure 3).

Substructures and Foundations

From its inception in 1870 until c1910, the Department of Docks made many technical advances in the design of pier substructures and bulkhead or river walls adapted to Port of New York conditions. Municipal waterfront construction reproduced successful pier and bulkhead designs at hundreds of sites in the port. Thus while surviving original information on the specific substructures at 55th and 56th streets appears limited, contemporary designs used elsewhere by the department probably mirror conditions at this terminal.

The wooden pile piers first built by the department at these sites were typical examples of this form as it emerged after the Civil War, by which time the port's pollution was eliminating the marine borers whose ravages had previously limited the use of foundations resting entirely on piles. A timber pile pier consists essentially of wooden piles driven into yielding harbor bottoms in rows about 10 feet apart, transverse to the long axis of the pier, with each row capped by heavy timbers, and with the entire array of piles and caps supporting a plank deck on longitudinal timbers. Municipal and many private builders preferred this form to earlier cribwork or cribwork-and-pile substructures because it was easier to construct in soft bottoms, was more elastic in ship-pier collisions, was easier to rebuild, and allowed for better passage of strong tides, harbor sediments, and wastes. Surviving plans of the pier built at West 55th Street c1883-84 show the diagonal and horizontal bracing within each pile row already favored by the Department of Docks (Figure 4). This pier, originally 650 by 60 feet in area, extended 500 feet past the bulkhead line along which the department did not actually build until c1891-93, shortening the pier approach. The department built a pier of the same size and, probably, design, at West 56th Street, about the same time the river wall appeared, with both piers thus extending 500 feet into the river (City of New York 1883 [plans], 1900-1940; Snow 1901; Hoag 1905; Raber, Flagg, Wiegand, and Antici 1984: 55-58).

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Pile structures below mean low water, in borer-free conditions, could last indefinitely; intertidal foundations lasted about twenty-five years, while wood decks subject to horse urine and other moisture deteriorated after a few years. The potential immortality of the lower foundations contributed to much retention of these elements in rebuilding projects. Piers 95 and 96 retained their original widths and presumably their lower piles and braces through several reconstruction programs. The Department of Docks extended the West 55th Street Pier 200 feet with all-timber construction c1906-11, reaching the federal pierhead line of 1897; the West 56th Street Pier received similar attention in 1912-13. By this time, department engineers had gradually developed a reinforced concrete deck design for timber pile piers to increase deck life. As applied after 1909 at new municipally-built terminals, this design included concrete slabs 10.5 inches thick and about 10 feet long laid directly on pile rows, with timber clamps at the top of each row replacing the usual caps and the concrete replacing all rangers, stringers and deck planking (Figure 4). Most municipal piers built this way after about 1912 had asphalt wearing surfaces on the concrete. The department or its contractors rebuilt the piers at 55th and 56th streets with such decks between 1914 and 1916 during planning or early construction of the terminal proposed between 55th and 57th streets, apparently adding the clamp timbers to the existing pilings. Both the original timber and later concrete decks at the 55th Street Pier were about 10 feet above mean low water. The pier deck at 55th Street was built for live loads of 500 pounds/square inch, and includes 2.25 inches of asphalt surface. Additional piles in alternate rows supported one-story piershed columns, as at 56th Street, while for two-story sheds as at 55th Street the columns usually rested on pile-supported concrete pedestals extending below the deck to mean low water (City of New York n.d.: 6, 8 [plans], 1900-1940; Staniford and Guise 1912; Staniford 1914).¹

Masonry river walls, built by the Department of Docks c1891-93 along the bulkhead line between 55th and 58th streets, define the upland terminal area covered by the bulkhead sheds. As developed by the department after c1875 from George McClennan's initial recommendations, the river walls derived strength and durability from large pre-cast concrete blocks laid on foundations of piles or concrete-covered rip-rap. The blocks extended between about 16 and 2 feet below mean low water. Concrete laid in place rested on the large blocks, with ashlar granite blocks completing the outer wall faces to elevations about 10 feet above mean low water. Figure 5 shows the type of wall probably built around 55th-56th streets, where the bulkhead remains today in excellent condition (Photograph 10). The department probably placed earth and ash fill behind the wall sections at or slightly after initial wall construction, with an asphalt surface. During bulkhead shed construction in 1916-17, contractors removed this surface for placement of utility lines and 4-foot-high concrete shed column foundation pedestals 4-9 feet square, rebuilding the surface in concrete and asphalt similar to the pier decks (Hoag 1905; City of New York n.d.: 5 [plans]).

¹The Department of Docks wood pile-concrete deck designs are generally well documented, and the substructures at Piers 95 and 96 are not of themselves significant. Field documentation did not include work under the piers to confirm substructure details.

Superstructures

Built-up steel I-beam columns, supporting built-up steel girders and/or steel roof trusses, frame all superstructures at both surviving piers in a single continuous set of connected piersheds and bulkhead sheds. Although divided historically by construction contracts, function, and tenant arrangements, the only physical separation of the three original pier complexes occurred at the two firewalls between the three bulkhead sheds, and each wall evidently had connecting doors. In this sense, the original terminal was one very large structure which included three piers.

Piersheds

Each of the two surviving piersheds has a single transverse bay on each floor. At Pier 95, the composite, bolted I-beam columns with 16-by-10-inch cross sections rise 42 feet above the pier deck, defining 33 longitudinal 2-story bays beyond the bulkhead line and 2 such bays inshore in the bulkhead shed, to support the horizontal framing for the second floor, the roof trusses, and the cargo mast system described below (see **Mechanical and Handling Equipment**). All longitudinal bays in the 2-story piershed proper are 20 feet wide, with bays 23.5 feet wide in the central bulkhead shed sections. The outshore end of the lower story extends 17.5 feet beyond the rest of the shed framing under the promenade deck, including four transverse 10-by-9-inch built-up I-beam columns. Principal transverse framing elements in the piershed, joining the shed columns, include 54-foot-long built-up girders with 5-by-1-foot I-sections under the second floor, and through trusses with 8-foot-high peaks and 1:5 slopes. Longitudinal framing members between bays include 9-, 15-, and 20-inch I-beams under the second floor deck, doorhead and lattice girders at deck and roof truss edges, and 10-inch channel beam purlins under the roof boards. Promenade deck framing includes 10-, 12-, and 20-inch I-beams. Inshore end framing slopes up slightly to accommodate a difference in pier and bulkhead shed deck elevations, apparently made during construction (Photographs 4, 6, 15, and 16; City of New York n.d.: 2, 8 [plans, reproduced in Photographs 32 and 35]).

With some exceptions, piershed framing at West 56th Street is similar. The single story shed has 32 20-foot-wide, and 3 12.5-foot-wide, longitudinal bays defined by built-up 12-by-10.5-inch I-beam columns 22 feet high. Most other transverse and longitudinal framing members mirror arrangements seen in the Pier 95 upper story. Other than height and the placement of cargo masts, the principal exterior difference between the two sheds is the presence in Pier 96 of three 30-foot-high shed roof sections inserted into the northeasternmost bay adjacent to the river wall, and into both sides of the seventh bay from the outshore pier end. Additional truss sections added to the typical roof trusses provide the added height for each such insert (Photographs 9, 10, and 20; City of New York 1985: 9 [plans, reproduced in Photograph 41]).

Steel-framed, galvanized-steel-covered cargo doors, each built for manual chain-lifting in two sections with the highest lift position parallel and just beneath trusses or girders, fill most bays on the north and south sides of both piersheds. Pier 95 cargo doors are each 20 feet high, with multi-paned fixed windows in the upper sections; except for two 30-foot-high doors

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under the higher roof sections in the seventh bay from its outshore end, all cargo doors at Pier 96 are 22 feet high and lack windows. Corrugated galvanized steel siding covers only bays originally used for interior enclosures and utilities described below: at the most inshore and outshore bays of the 56th Street piershed; and, at Pier 95, both stories of the inshore bay, the eighteenth bay from the river wall on the north side, the upper story of the outermost bay, and the narrower bay under the promenade deck (Photographs 1-4, 6, 9, 10, 15, 16, 18, and 20; City of New York n.d.: 10 [plans, reproduced in Photograph 36]).

Department of Docks engineers added classicized facades to the outshore ends of both piers, using crimped or galvanized iron sheets riveted to steel frameworks of 5-, 6-, 10-, and 12-inch channel beams and smaller bars. These materials, with some wrought iron details, mask the one-bay gable ends with pedimented triple bays set off by Doric pilasters. Both piers have very similar pilaster, entablature, and pediment designs, with the principal facade differences resting in definition of the stories. The 14-foot-wide concrete promenade deck at Pier 95, surrounded by a railing of steel pipe, splits the facade vertically into two stepped sections, the uppermost of which had all three bays filled with plate glass around single and central double oak doors, while the lower level had a central 11-by-13-foot rolling steel shutter door flanked by nearly closed bays with 2.5-foot-square windows. The Pier 96 facade is essentially the lower facade section at Pier 95, with entablature and pediment added: the central bay had a 14.5-by-13.5 rolling steel shutter door below two 7-by-4-foot windows, flanked by and bays with two 4-by-5-foot windows apiece over steel siding. All of the doors and windows on both pier facades are now removed, destroyed, or fragmentary, and most other three-dimensional details are also gone, but the original flagpoles survive (Photographs 4, 7, and 11; City of New York n.d.: 2 and 12 [plans, partly reproduced as Photograph 32]).

When last painted at an unknown date, the piers both had what are now nearly vanished coats of medium or light green, a color still seen at New York City municipal waterfront structures. Light colored lettering across the frieze at Pier 96 still defines most of the words **NAVIGAZIONE GENERALE ITALIANA**, dating to the original tenant here, while raised metal characters on the acroterion locate the pier at 56 ST. 55 ST appears at a comparable location at Pier 95, but it is not clear from original plans, historic views, or surviving fabric if Furness, Withy & Co., Ltd., ever had similar frieze decoration (Photographs 4, 7, 11; City of New York n.d.: 2 [plans, reproduced as Photograph 32]).

A few damaged windows at the inshore pier ends mark interior spaces. Pier 96 has one 4-by-3-foot window for a toilet in the southeasternmost bay above the river wall. Larger Pier 95, with more interior spaces, has two 6-over-6, 6-by-3-foot windows for two toilets in the northeasternmost lower bay, and three similar windows for office and toilet space in the southeasternmost lower bay, all of which follow original plans in location but have sloped framing to accommodate the pier/bulkhead deck elevation differences noted above. Both sides of the upper inshore bay at Pier 95 have a total of five 6-over-6, 4-by-3-foot windows, probably added for interior sheds sometime after original construction; two similar, probably added windows penetrate the innermost upper story cargo door (Photographs 2, 6, 10).

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Both piers have similar roof construction of 1.5-by-8-inch, tongue-in-groove spruce roof boards over the purlins, under layers of tar paper and asphalt/tar combinations with copper flashing. Eight 24-inch-diameter galvanized ventilators punctuate both ridge lines, at the middle of every fifth bay beginning in the fifth bay from the bulkhead. With the exception of scuttles on the three Pier 96 shed roof sections, roof bays have pairs of 10-by-5.5-foot, 6-pane skylights with .25-inch wire glass, alternating near ridge lines and roof edges. Gutter pipes encased in raised roof edges drain into galvanized 4-inch leaders running down every fourth shed column. Although not yet penetrated by many actual holes, both roofs have suffered greatly from lack of maintenance and, at Pier 96, recent fire damage, but they retain substantial remains of cargo handling systems discussed below under **Mechanical and Handling Equipment** (Photographs 9, 10, 12; City of New York n.d.: 6, 8, [plans, reproduced in Photographs 34 and 35]).

Bulkhead Sheds

Framing for the gable-roofed central section of each bulkhead shed carries through from the piersheds, as noted above, with the exception of the second floor supports. The central 44-foot-long transverse girder and its northern supporting column provide room for elevator, stair, and baggage conveyor facilities, while the 32-foot-long inshore girder over the street entrance rests on a central column and brick facade walls. The three most inland roof trusses at Pier 95 carry suspended steel frame, 32-foot-wide arches for the second story plaster ceiling, joined by 8-inch channel beams. In each of the 100-foot-long shed-roofed sections north and south of the central bay at each pier, built-up 10-inch I-beams define five bays and support through trusses with 14-foot clearances above the deck. A row of 6-inch I-beam columns at 9.25-foot-intervals under the southernmost truss at Pier 95 frames the southern end wall of the shed; the more poorly documented Pier 96 bulkhead shed may have similar framing at its northern end. Lattice or doorhead girders 2 feet high link the waterside ends of the trusses, with 10-inch channel beam purlins and provide all other longitudinal framing. There is an additional low shed-roofed section rising above part of the passenger stair described below at Pier 95, 20 by 28 feet in area with the roof sloping along the long axis of the shed, adjacent to the northeast corner of the central section (City of New York n.d.: 7, 9, 10, 11, and 13 [plans, partly reproduced in Photographs 36 and 37]).

The 55th Street bulkhead shed has four exterior sides: one at the extreme south end of the terminal, one on either side of the piershed along the bulkhead line, and the 260-foot-long street facade. Pier 96 has somewhat similar street and waterside exteriors, but originally had no north exterior since it abutted the Pier 97 bulkhead shed. The original north end of the present complex was an 8-inch-thick hollow terracotta block firewall separating the two sheds. After the removal of the southern Pier 97 shed section in 1926, an 18-foot-wide steel cargo door similar to those seen elsewhere on Pier 96 replaced the westernmost section of this wall. The south wall of Pier 95 consists of comparable terracotta block construction, with a stepped upper section between the columns under the roof truss and concrete block caps. Steel framed cargo doors, 16.5 feet high but otherwise identical to those along Pier 96, define the central three bays of each waterside exterior section at Pier 95, while galvanized steel closes the other four

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bays. Two six-over-six windows in the waterside bay immediately south of the pier mark interior office space which encompasses the south pier/bulkhead shed junction. At Pier 96, identical cargo doors fill the southernmost three and the northernmost four waterside bays, with windowless galvanized siding in the remaining bays (Photograph 10; City of New York n.d.: 7, 9).

The long street facade reflects bulkhead shed structural divisions, while masking the different roof ends with strong horizontal lines of Ionic entablatures featuring pronounced dentils. Buff-colored brick walls, 16 inches thick along the lower shed sections and 20 inches thick along the projecting 60-foot-wide central facade sections, rise above 8-inch-thick, 34-inch-high granite false pedestals. Except in the central sections, the brickwork is not loadbearing. At the central sections of the surviving pier facades, the brick rises 35.75 feet at Pier 95 and about 25 feet at Pier 96, encompassing 32-foot-wide arches with cast concrete keystones beneath the 10.3-foot-high entablatures, made of white glazed terracotta tiles on red brick backing. Built-up steel girders, 4 feet high and embedded in the brickwork, divide each central arch and support steel, cast iron, and glass infill above. Dark green paint covers all metal facade elements. Pairs of oak lifting doors, divided by 12-by-10-inch built-up I-beam columns, closed entrances below the girders; all are now inoperable and deteriorated, with some destruction of glass and wood panels. Door counterweight structures stand inside the corners of each 4-foot brick return at central section ends. The exterior returns are fully detailed (Photographs 3, 5, 8, 19; City of New York n.d.: 1-3 [plans, reproduced in Photographs 31-33]).

The varying widths and heights of the original pier ends created very different proportions among the three original central facades, as identical pedestal and entablature dimensions contrasted with arch radii treatments. The greater uniformity and more controlled proportions of the lower bulkhead shed sections are more visually successful, and gave integrity to the entire terminal street facade. The granite pedestals, brick color, 5-foot-high terracotta tile entablatures with small dentils, and cast concrete keystones relate the 27-foot-high facades directly with the larger central sections. Each structural bay of the lower sections emerges as a brick arch 18.3 feet high, and 10 or 12 feet wide with semi-circular upper steel and glass infill above plate glass windows, single or double oak hinged doors, or oak lifting doors framed in steel with cast iron and sheet metal details. Except where the sheds for Pier 96 and Pier 97 meet at adjacent lifting door arches, the narrower arches mark the north and south bays of each shed section. Concrete curbing fronts all window and pedestrian door arches, while the paved surface east of the terminal continues through all lifting door arches between cast iron pedestal guards. The placement of doors and windows within this treatment sometimes served functional ends, as where doors entered offices or passenger vestibule areas, but was sometimes as unrelated to interior shed spaces as the facade was generally structurally unrelated to the sheds and piers. Except for sheet metal covering placed over the second arch from the southern end of Pier 96 during sprinkler valve shed construction c1953, the facade apparently retained its original integrity throughout the period of steamship company use. The facade today extends north to the fourth bay of the southern shed section at the Pier 97 site, with highly varied survival of interior arch treatments (Photographs 3, 5, 8, 13, 19; City of New York n.d.: 1-3, [reproduced in Photographs 31-33]).

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Facade decoration, other than the architectural detailing described above, appeared only on the central bulkhead sections. Surviving original plans for the 55th Street Pier called for raised copper lettering to spell **FURNESS WITHY & CO. LTD.** in the frieze and the names of possible sub-tenants **LLOYD SABAUDO** and **SWEDISH-AMERICAN** on either side of the arch, a pair of concrete medallions below the frieze with the anticipated 1916 date of construction, and a raised italic **55 ST** on the infill below the keystone. As built, the 1917 date of shed completion was incised into the right medallion, matched on the left by the incised vertical initials **F W**; both these details survive, along with the infill characters. There is no record of raised lettering beside the arch. Original and later frieze lettering went through several underdocumented changes (see Photographs 27 and 30) prior to the c1962 installation of an electric sign, now partially removed, for **Furness BERMUDA Lines** above the entablature. Other undocumented facade details include **PIER 95**, painted below the infill sometime after c1935 (cf. Photograph 30) and three cast iron flagpole bases riveted onto the facade girder and central column. The flagpoles, one of which remains, may be original construction features not originally planned for the terminal (Photographs 27-30; City of New York n.d.: 1, 2 [plans, reproduced in Photographs 31-32]; 1926-67: Manhattan 4639A).

The 56th Street Pier had similar but fewer decorative details: concrete medallions, italic **56 ST** in the arch infill with a later **PIER 96** painted on the girder below, and a single flagpole in a cast iron base at the facade center. The medallion initials are raised rather than incised, suggesting that the **I.** on the left and the **L.I.** on the right were added over original characters sometime after the 1932 formation of the new amalgamated Italia line; **Lloyd Italiano**, the only North Atlantic line with appropriate initials, may have retained some corporate identity after its 1918 takeover by **NGI**. **NAVIGAZIONE GENERALE ITALIANA** appeared on the terracotta frieze, probably as part of original decoration with subsequent removal under **Furness**, which may have erected an electric **Furness Lines** electric sign in 1962 (Photographs 8, 28; Bonsor 1979: III, 1342-45; City of New York 1926-67: Manhattan 4640).

The terminal street facade rises above adjacent bulkhead shed roofing, forming 5-foot-high parapets along the lower shed sections. The common brick firewall between the two piersheds, with a stepped top, meets the parapet. Wooden backing for the two central upper facades, built of nominal 2-by-4-inch framing and 1-by-6-inch tongue-in-groove sheathing, may be undocumented attempts to prevent moisture from eroding the facade masonry. A small flagpole attached to the backing at Pier 96 rises above the roof peak and the facade. Copper flashing marked all facade-shed roof junctures, which today include a variety of cement and roofing materials marking previous minor repairs. Bulkhead shed roofs were identical in original construction to those seen on the piersheds. Two skylights similar to those on the piersheds appear over the second and fourth bays of both surviving south shed sections, while each north shed section has three skylights. Pier 95 has one additional skylight on the raised roof over the passenger stair. A second additional skylight planned at Pier 95, atop the elevator shaft rising to just below the central facade top, was evidently not built (Photographs 6, 8-10; City of New York n.d.: 2, 7 [plans, partly reproduced as Photograph 32]).

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Interiors

Piersheds

Both piersheds are essentially open interior spaces for cargo and passenger movement, with small enclosed storage areas in corners of outshore pier halves, and toilets and additional storage areas at inshore ends adjacent to the bulkhead sheds. A hollow terracotta block firewall, penetrated by a sliding tin-covered wood door 16 feet long and 14 feet high, divides the lower level of Pier 95 transversely at the pier center to form the only large and original interior division inside the two piersheds. Other fire-resistant interior structural elements include two corrugated steel curtains added to roofs trusses in each pier c1953, in trusses located 262 and 462 feet from the upper outshore end of the 55th Street piershed, and 112.3 and 317.5 feet from the outshore end of the 56th Street piershed.

Original plans suggest Pier 95 had no interior enclosures beyond the first inshore bay, except perhaps a 10.75-foot-high, 20-by-16.5-foot concrete room in the north side of the first lower level bay outshore of the firewall, on top of which room sat heating equipment discussed below. This room, currently fitted with a wood floor, coat hooks, and an inoperable radiator, appears to have last been a longshoremen's staging area/coat room, although it may have once served as a paint storage room. The only other permanent features on the lower level beyond the first inshore bay were two 3-foot-diameter metal spiral stairs, located as shown in Photograph 31, which rose some 22.25 feet to the top of the 4.5-inch-thick, reinforced concrete upper deck, rated for 250 pounds/square inch and covered with a .5-inch asphalt layer. Two 12-by-5-foot holes in the upper deck led to baggage chutes which have not survived on site (see Photograph xx). At undocumented times after terminal construction, Furness Withy & Co., Ltd. built eight steel-frame, metal-sided sheds for storage and baggage handling, as shown in Photograph xx: two at the lower outshore end; one at the northern upper outshore end; one at the second southern lower inshore bay, with open steel mesh double doors, possibly used to store hoist or other machine oils; and four at the first two upper inshore bays (Photographs 15-16; City of New York n.d.: 1, 1985: 4 [plans, reproduced as Photographs 31 and 40]).

The inshore ends of both piers originally had steel-framed, metal-walled toilet and washroom areas for longshoremen, decorated with floral or geometric pressed tin panels on walls and ceilings. In Pier 95, two such 12-to-13-foot high spaces encompass an area 4.6 by 16 feet in the northeasternmost bay, with a third toilet 6.5 by 14 feet on the opposite wall, adjacent to what was originally a similarly constructed office built around the corner of the piershed and bulkhead shed (Photographs 17, 31).³¹ Furness Withy subdivided this latter space along the bulkhead line in 1942, creating a 20-by-6.6-foot lunch stand--later apparently a union office--with the construction of a second interior wall in the bulkhead shed section of the office (Photograph 40). Pier 96 originally had two toilets in the southeastern piershed corner, similar to those at Pier 95, in adjacent 9.75-foot-high rooms totalling 10 by 18.5 feet in area. The only other original interior features in this piershed were a 15.3-foot-long sliding, metal-covered door for the 14.5-foot-high opening in the hollow terracotta block firewall at

the inshore pier end, and a steel-framed, wood-decked platform in the north-eastern corner of the piershed. The latter structure, 20 by 30 feet and 15.5 feet above the deck, supports heating equipment discussed below. Furness Withy built a 10-foot-high cargo locker for valuables under the platform in 1938, 15.2 by 17.5 feet with a wire-mesh, 7-foot-high double door through the firewall; a later undocumented wire-mesh enclosure fills the rest of the southeasternmost inshore bay adjacent to the toilets (City of New York n.d.: 1, 1985: 4, 9 [plans, reproduced as Photographs 31, 40, and 41], and 1926-67: Manhattan 1526 and 2794).

Bulkhead Sheds

The most visually distinctive interior spaces in passenger ship terminals were those built for passenger waiting and movement, in contrast to more utilitarian office and storage spaces which appeared at a variety of large cargo-handling piers in the Port of New York. Passengers and their baggage moved between ship decks and upper piershed decks, and between upper piershed decks and marginal street areas. The lower decks of two-story passenger ship piers served largely to handle and store general cargo, requiring truck access through piershed central street entrances. In wider piers such as at 57th Street, stairways, elevator, and baggage escalators could link upper deck and street levels in a flow parallel to a pier's long axis, with lower ends of such links located to one side of the street entrance. At Pier 95, the 55-foot-wide piershed precluded this arrangement and required an L-shaped traffic flow. A waiting room on the upper deck, adjacent to the street facade, connects to a vestibule with lower ceilings in the first two bays of the lower bulkhead shed section to the north, via an elevator, a 10-foot-wide double stairway with steel and wood bannisters, and a 5-foot-wide electric baggage escalator with toothed wooden slats. Terracotta block walls rising the full height of the lower bulkhead shed define an area about 54 by 17.4 feet between the lower passenger areas and the rest of the shed, with utilities and mechanical equipment installed under the stairs and escalator. Decorated pressed tin panels cover or once covered most vestibule and stairwell surfaces, as well as the ceilings and upper wall surfaces of the bathrooms and offices lining the waiting room above. A curved plaster ceiling with meander-pattern fillets, originally painted an unknown color, dominates the 45-by-33-foot waiting room which connects with the upper piershed deck via seven doors. Fragments of the pink Tennessee marble wainscoting and door trim survive where this material once finished north, south, and west waiting room surfaces, and the women's bathroom off the southeastern waiting room corner. Photographs 31 and 40 show the arrangement of the bathrooms and offices around the waiting room (Photographs 21-22; City of New York n.d.: 3, 13, 1985: 4 [plans, reproduced as Photographs 33, 37, and 40]).

Photographs 31, 40, and 41 show some original and current arrangements of other interior bulkhead shed spaces at 55th and 56th streets. Original offices, with some later subdivisions, were wood-framed structures 21 feet wide and 12.7-13.7 feet high, with decorated pressed tin on all ceilings and walls, including exterior walls inside the shed. Furness Withy added a number of paint, plumbing, carpenter, and machine shop spaces at 55th Street between c1938 and 1950. There additions include a metal-walled, enclosed mezzanine built in the southern two bays of the bulkhead shed with 8-by-6.5-

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inch I-beam columns 8.3 feet high, 1-by-6 inch girder joists, and a yellow pine floor; and an adjacent two-story metal-walled enclosure along the next waterside bay. Immediately south of the boiler room at the 55th Street shed's northern end, discussed below, Furness Withy also added a two-story frame structure, the upper level of which appears to have served recently as a lounge for city personnel. A similar two-story structure was added to the southeastern corner of the Pier 96 bulkhead shed, next to the c1953 dry pipe sprinkler valve room.¹ The northern section of this shed, including a 12.75-foot-long battery, motor and generating room, and the 38.2-foot long boiler room adjacent to the offices (Photographs 17, 19; City of New York n.d.: 1, 1985: 4, 9 [plans, reproduced as Photographs 31, 40, and 41]).

Utilities

Original terminal facilities included direct current electrical and water connections with municipal systems extending to the adjacent paved areas. These connections provided for overhead lights suspended from trusses, ceiling, and inshore facade walls, for several ornamental lights on outshore facades, for motors driving the elevator and baggage escalator in Pier 95, and for plumbing. Most motors and lights, and some plumbing fixtures, survive in deteriorated form, although there has been extensive stripping of all electrical outlets and other fixtures with copper components.

Each pier/bulkhead shed had its own heating plant, much of which remains in place. Pairs of coal-fired, horizontal return, fire tube boilers, manufactured by the Titusville Iron Company of Titusville, PA, provided steam for heating systems from terracotta-block-enclosed boiler rooms with plaster ceilings at or near the north end of each bulkhead shed. Stacks extend about 43 feet above shed roof. Coal supply facilities remain unclear: Pier 96 has no apparent coal room; the 9-foot-wide coal room at Pier 95, built smaller than shown in original plans, retains no evidence of supply intakes. Furness Withy converted the Pier 96 boilers to oil-fired units at an unknown date, with burners made by Todd Shipyards Corporation. The boilers fed two types of heating systems. Networks of low-pressure, two-pipe, overfeed radiators heated bulkhead shed offices and passenger areas; a small number of the radiators survive. Hot blast systems provided heat to piershed areas encompassing the full length of Pier 96 and the outer half of the lower deck at Pier 95, through steam-heated, condensate-return air heaters and forced air blowers which fed insulated sheet metal ducts supported by roof trusses or floor girders. Virtually all the ducts survive. The entire air heater and blower plant survives at Pier 96 on the platform at the inshore pier end, including a Niagara Conoidal Air Heater and a blower from the Buffalo Forge Company operated by a variable direct current motor. Copper resistors and a control panel for the motor are partly intact on the bulkhead shed deck, behind a metal wall in the first bay to the north. The air heater at Pier 95, located beyond the mid-pier firewall on top of the concrete enclosure noted above, has disappeared (Photographs 15, 18, 19, 23, 24; American Society of Mechanical Engineers 1912; Theodore Audel & Co. 1921: 2,916-933, 2,967-968; City of New York n.d.: 16 and Wm. J. Olvaney n.d. [plans, partly reproduced in Photographs 38 and 39]).

¹The sprinkler valve room is mislocated one bay to the north in City of New York 1985: 9 [plan, reproduced in Photograph 41].

Furness Withy apparently installed charging equipment supplied by the Conlan Electric Company c1937, north of the Pier 96 boiler room, for a plant including two 40 h.p. motors, two 25-kw generators, and batteries with plug-in boxes. The charging plant probably dated to original terminal construction. The charging panel from this installation survives adjacent to the boilers. While undocumented, it is likely this plant serviced the portable electric winches, baggage escalators, and belt conveyors used at the terminal, and may have been the only such power source among the three original piers (U.S. Army Corps of Engineers 1926, 1932, 1942, 1953, 1965; City of New York 1926-67: Manhattan 1350).

The dry pipe sprinkler systems installed on both piers c1953 by the Raisler Corporation, with valves supplied by the Belable Automatic Sprinkler Company of Mount Vernon, NY, survive intact. At Pier 95, the valve room is a wood-framed, wallboard-sided enclosure under the passenger stairs and baggage escalator. The Pier 96 valve room is a 10.5-foot high, 15-by-21-foot metal structure in the second bay from the south end of the shed (Photographs 18, 19, 25; Raisler Corporation 1953 [plans]; City of New York 1985: 4, 9 [plans, reproduced as Photographs 40 and 41]).

Mechanical and Handling Equipment

Passenger liner piers such as Pier 95 handled two principal types of cargo: baggage and breakbulk freight. If ships using such piers carried bulk commodities such as grain, which remains undocumented, special purpose vessels would have worked the moored ships on offshore sides, with no use of a pier. Baggage handling involved use of portable escalators or conveyors between pier and ship, especially to upper decks, with hand-powered or mechanized trucks or tractors for movement along the decks. Baggage reached street level via chutes through upper decks, as at Pier 95, and fixed baggage escalators. General cargo movement between ship and pier usually involved use of cargo masts, ships' winches, and fixed or portable winches on the piers. Cargo movement on the pier could involve the same trucks or tractors used for baggage, forklifts after c1960, and trucks for cargo transport off the pier into the streets. Most of the equipment used on the piers was thus portable, allowing deployment to both varied stowage points on a ship and to different piers used by the same tenants or stevedore companies. Pier 97 shared a variety of equipment after 1936 under Furness, Withy & Co., Ltd. and the Bay Ridge Operating Company. Prior to 1936, Navigazione Generale Italiana and its successor, Italia, used a common array of portable equipment at West 56th and 57th streets. The location of the battery charging plant on Pier 96 suggests that all terminal tenants had access to this point. The principal apparent difference between NGI and Furness, Withy was the Italian line's reliance on more hand and machine trucks (U.S. Army Corps of Engineers 1926, 1932, 1942, 1953, 1965).

Only some of the permanent equipment survives at the West 55th and 56th street piers. The only trace of baggage handling equipment is the electric escalator at Pier 95, which appears to retain all parts including the motor suspended under the upper end. Pier 97 evidently had a similar feature, as did other undocumented passenger ship piers.

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The surviving piers at this terminal have substantial remains of two types of cargo mast systems, reflecting their different heights. One-story Pier 96 has 35-foot columns extended above every fourth piershed column beginning at the third bay from the bulkhead, providing a height of about 57 feet above the pier deck. Each column is a built-up, 12-by-10 inch I-beam. Steel star struts, each made of two angle bars bolted together, brace the columns to steel plates bolted to the roof truss upper chords. Taut wire stay cables 1.5 inches thick join the columns, and also secure the last column in each row to the piershed roof, from plates riveted to each column top. Cargo cables 2.25 inches thick suspended below the stay cables could support, on stirrups which do not survive here, mobile hoisting blocks for use with winches and lines. This arrangement was common at one-story cargo piers in the Port of New York, which generally served ships of moderate height. Although Pier 96 served passengers as well as general cargo, its limited baggage and passenger facilities and single story evidently precluded handling of larger transatlantic or Bermuda ships. The two higher shed doors allowed for some service of taller passenger vessels (Photographs 9-10; Figure 6; Staniford 1917).

Pier 95 has the more rigid system, with steel beams between cargo masts, used for two-story piersheds built in the port after c1900. The 28-foot-high columns, extending for 32 bays beginning at the second bay from the bulkhead, have I-beams and star-strut braces identical to those at Pier 96. Like the earlier Chelsea Piers, and the North German Lloyd terminal at Hoboken, stirrups suspended from the beams supported hoisting blocks. The earlier system of rigid beams in line with the cargo masts had some recognized problems which city engineers addressed at piers built after 1915: running cables through blocks directly above the shed side wore excessively on the yellow pine door head girder fenders, and movement of hoisting blocks on rigid beams during lifting operations put stress on the stirrups. Designs for the municipal pier at West 46th Street, erected 1915-18, addressed the first problem by extending the cargo beams 2 feet outshore on a curved steel member and replacing the pine fenders with curved steel plates riveted to door head girders and filled with cement mortar. Designs for the West 55th and West 57th street piers incorporated the new door head girder fenders, and addressed the second problem for the first time by hinging the cargo beams to the columns, allowing them to revolve so that the beam was always normal to the pull of the hoisting lines. The hinged design involved framing extension supports from the cargo masts, and hanging the cargo beams from the supports with steel pins. Most 6-by-1.25-inch, cargo I-beams at Pier 95 support three stirrups at 5-foot intervals. The cargo mast columns also support 2.3-foot-wide wooden catwalk decks, equipped with lights, ladders, and pipe rails (Photographs 4, 6, 12; City of New York n.d.: 8 [plans, reproduced as Photograph 35]; Staniford 1917).

Use of electric winches with cargo masts began in the Port of New York at the large passenger ship piers, with deployment at other piers or cargo handling facilities in the port only after World War I. Electric winches were eventually favored over earlier steam winches by their greater speed, safer operation in greater power and more uniform speed, elimination of potentially frozen pipes or cylinders, and greater maneuverability. As indicated in Figure 7, they were usually deployed only on lower decks, requiring ships' winches for upper deck-ship transfers (Taylor 1920: 30).

WEST 55th STREET AND WEST 56th STREET PIERS
(Piers 95 and 96, North River)
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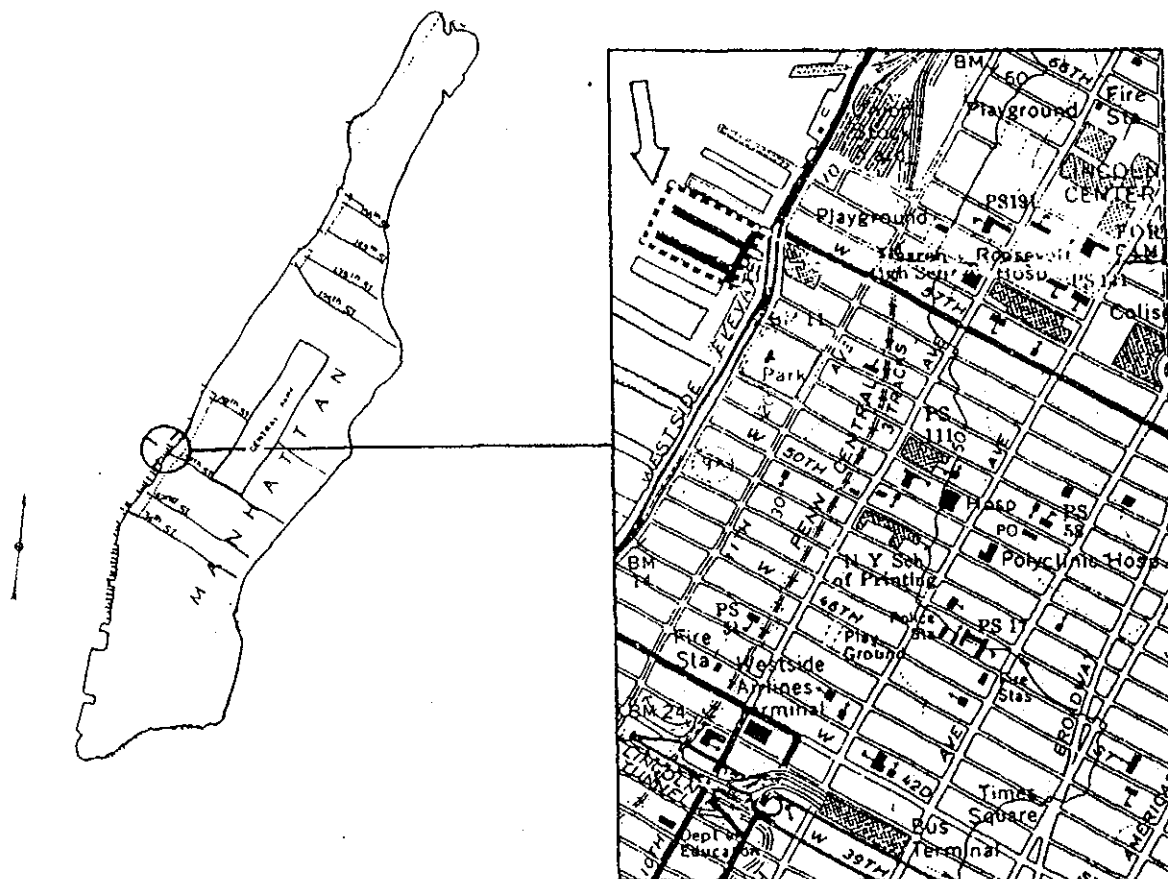
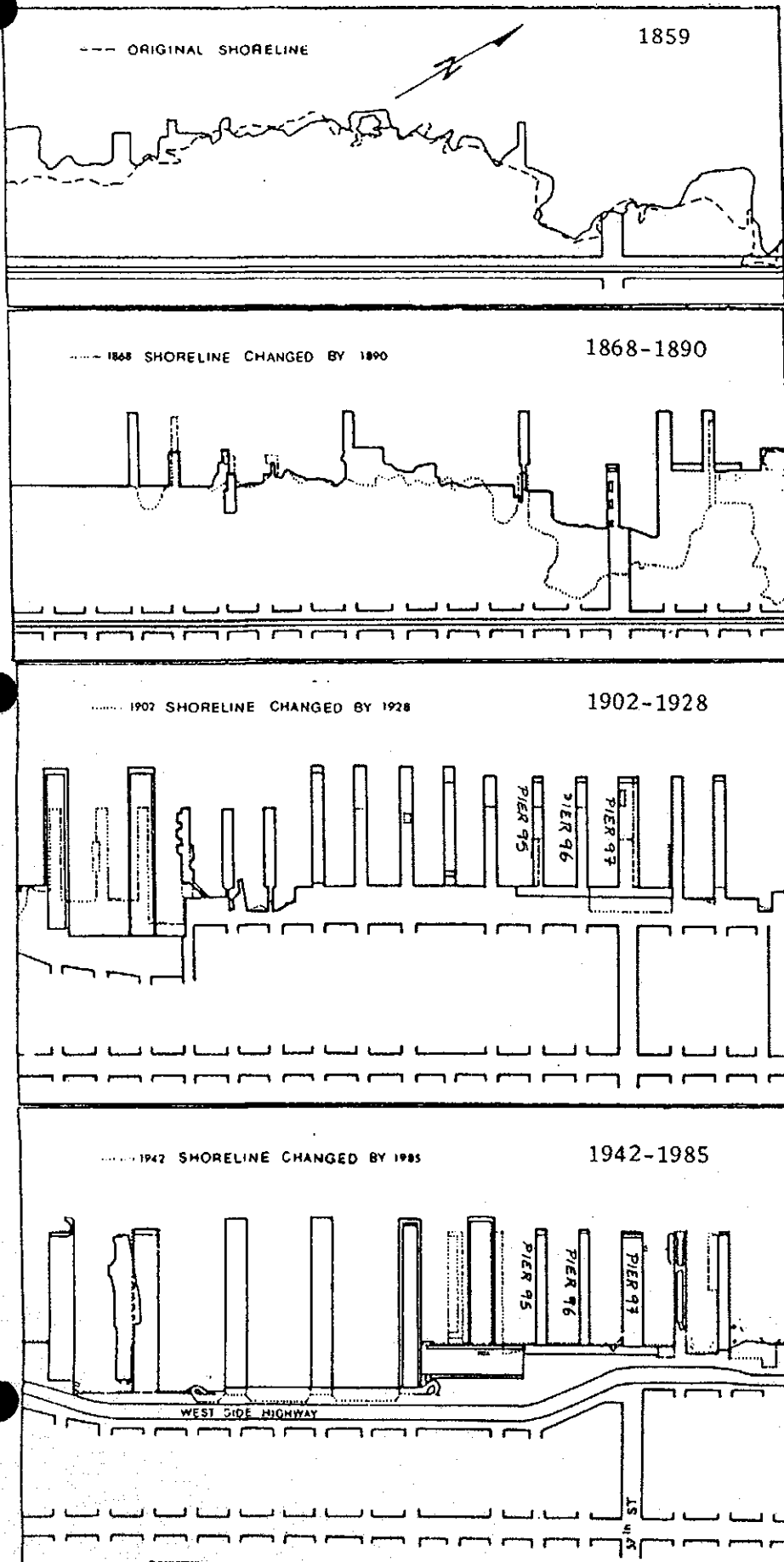


Figure 1. LOCATION OF WEST 55th AND WEST 56th STREET PIERS ON MANHATTAN ISLAND

WEST 55th STREET AND WEST 56th STREET PIERS
(Piers 95 and 96, North River)
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SHORELINE DEVELOPMENT AT AND
AROUND WEST 55th AND WEST 56th
STREET PIERS, 1859-1985

0 750 FEET

Figure 2

WEST 55th STREET AND WEST 56th STREET PIERS
(Piers 95 and 96, North River)
HAER No. NY-147 (Page 24)

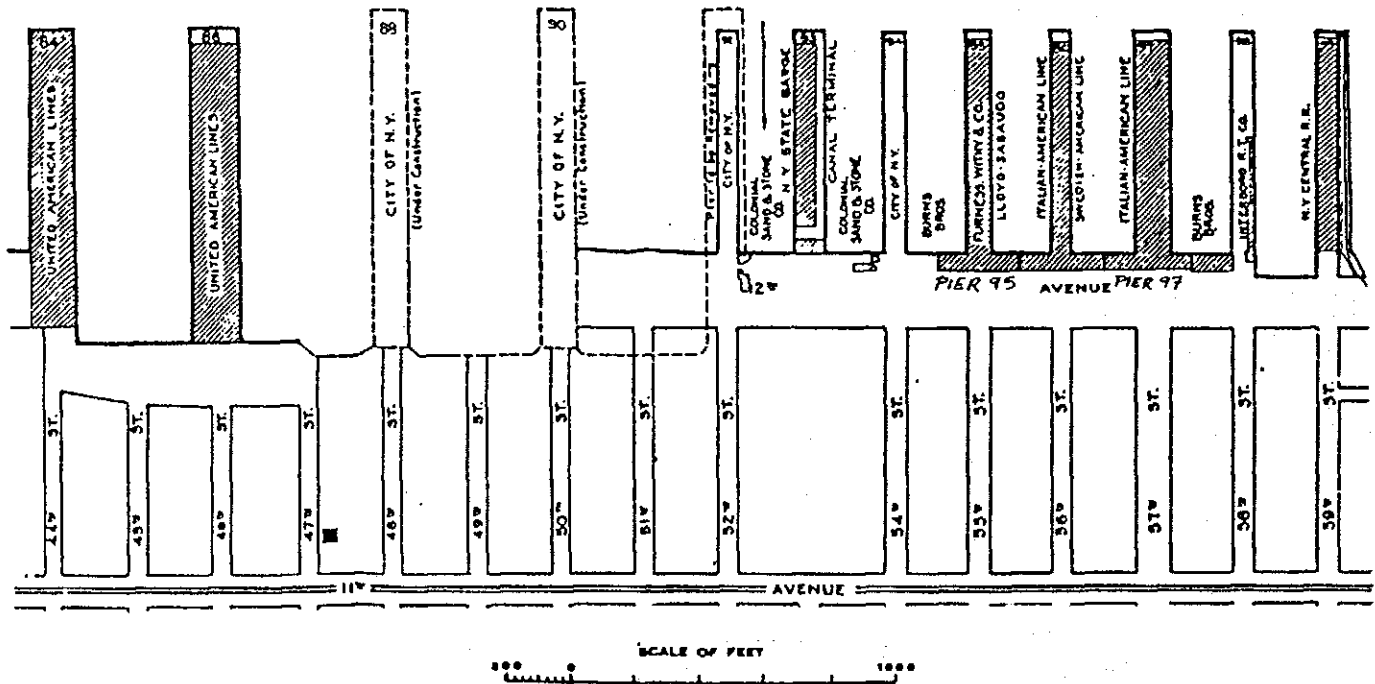
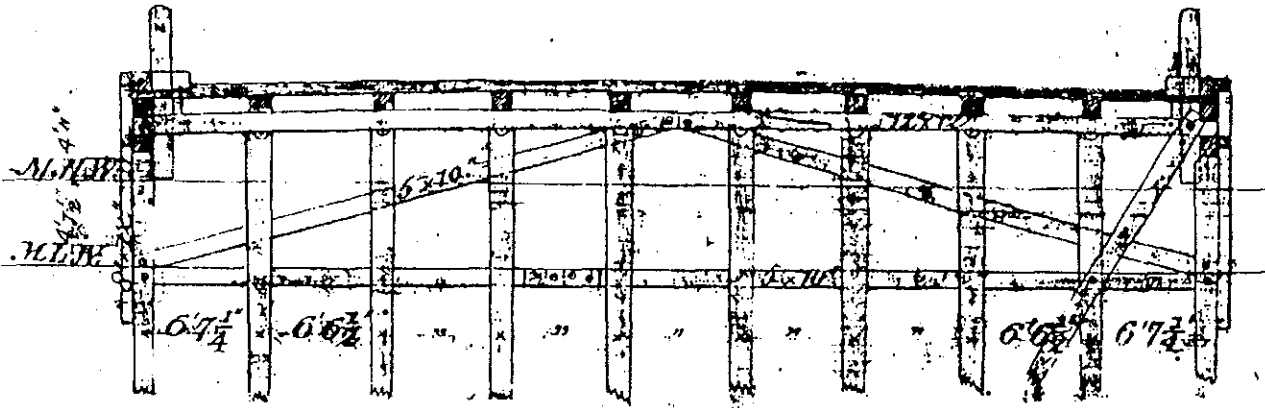


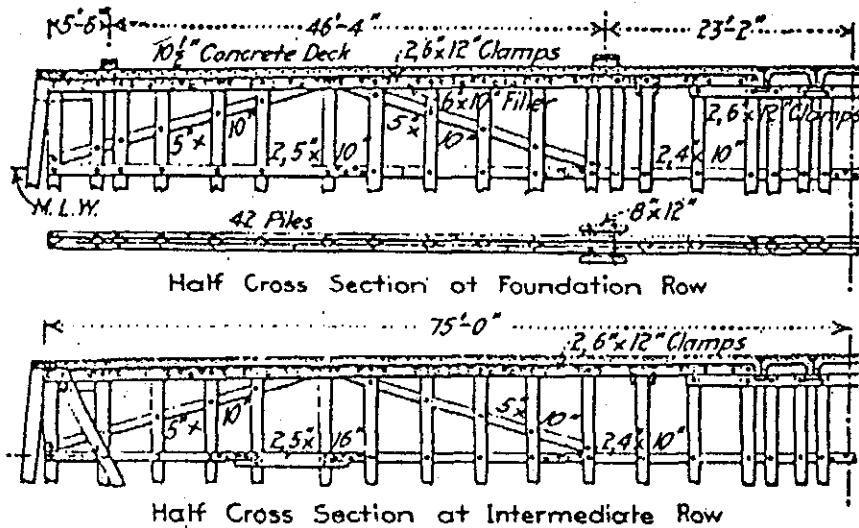
Figure 3. NEW YORK CITY LINER PIER DEVELOPMENT ON NORTH RIVER, 44th TO 57th STREETS, c1932

Source: U.S. Army Corps of Engineers 1932

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Section of Original West 55th Street Pier



Typical Department of Docks Concrete Deck-Wood Pile Pier, after 1909

Figure 4. DEPARTMENT OF DOCKS ALL-TIMBER AND CONCRETE DECK-WOOD PILE PIER SECTIONS

Sources: City of New York 1883; Staniford and Guise 1912

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(Piers 95 and 96, North River)
HAER No. NY-147 (Page 26)

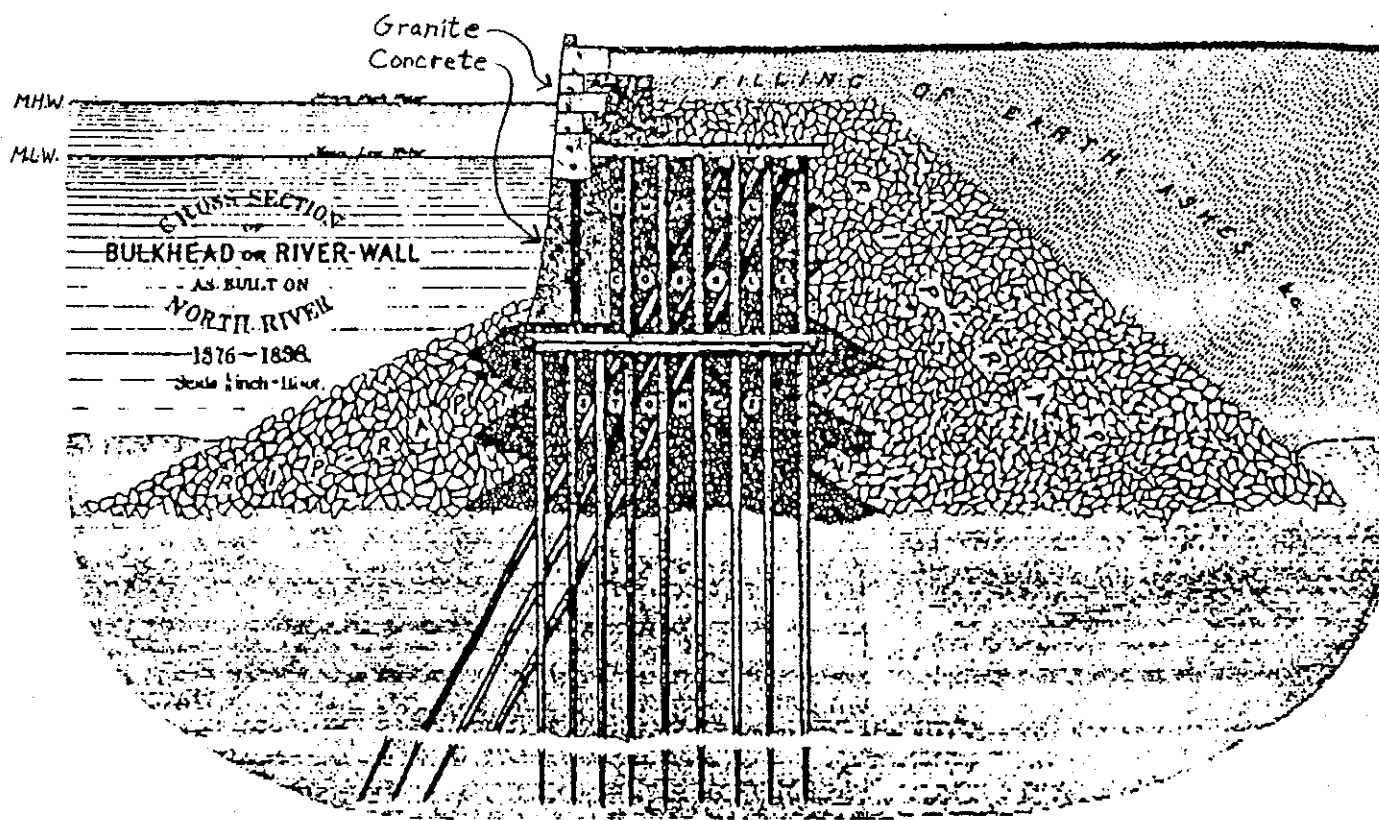


Figure 5. TYPICAL MASONRY RIVER WALL SECTION, AS BUILT AT WEST 55th AND 56th STREETS

Source: Hoag 1905

WEST 55th STREET AND WEST 56th STREET PIERS
(Piers 95 and 96, North River)
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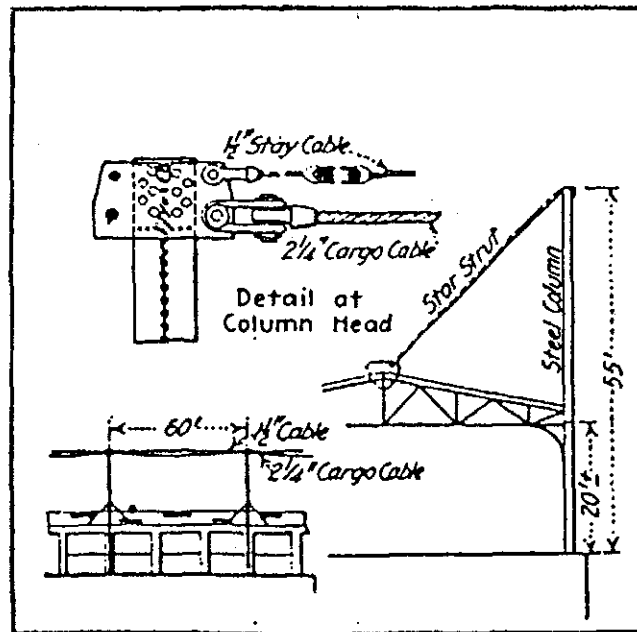


Figure 6. WEST 56th STREET PIER CARGO MAST DETAILS

Source: Staniford 1917

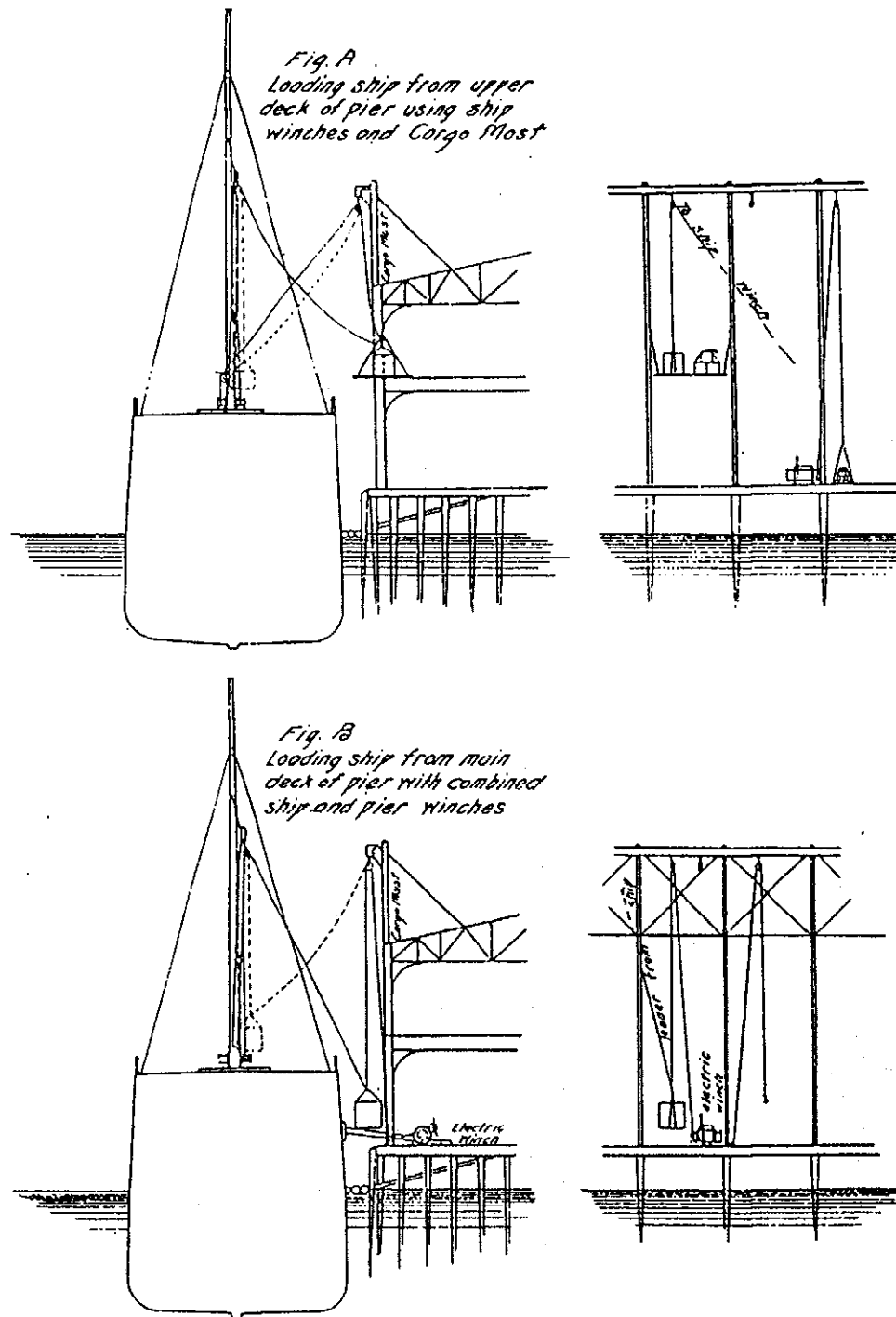


Figure 7. CARGO TRANSFER METHODS WITH CARGO MASTS AND ELECTRIC WINCHES

Source: Cresson and Staniford 1912

Part III: Sources of Information

Plans and Drawings

The New York City Department of Ports, International Trade, and Commerce (until recently the Department of Ports and Terminals, and the direct successor of the Department of Docks) appears to retain all surviving original drawings pertaining of the West 55th Street and West 56th Street piers. Most of the drawings are somewhat randomly stored in a second floor vault at department offices in the Battery Maritime Building, with recent demolition drawings, prepared by department engineers and noted below, in active engineering files. The demolition drawings draw heavily on original construction plans, in most cases being amended copies, which suggests that although research for this documentation revealed virtually no original plans for Pier 96, the demolition drawings of Pier 96 derive from original plans which have recently disappeared. Future searches may thus resurrect plans for Pier 96. Asterisked items in the list below are included in photographs made for this documentation.

Department of Docks Work Prior to Terminal Construction

City of New York, Department of Docks

1878 Plan for Bulkhead or River-Wall and Platform between 55th and 58th Streets N.R. 3 sheets.

1883 Pier at 55th Street, N.R. 3 sheets.

Original Construction of West 55th Street Pier

City of New York, Department of Docks and Ferries

n.d. Contract 1519/Freight Shed/W. 55th ST. IMPROVEMENT/Borough of Manhattan. 16 sheets; no. 4 is missing.

- *1. General Architectural Plans and Elevations
- *2. Inshore and Outshore Elevations
- *3. Bulkhead Shed and Waiting Room Details
- (4. Shed Foundations and Repairs to Pier)
- 5. Concrete Flooring and Foundations on Bulkhead
- *6. General Framing Plans - Pier Shed
- 7. General Framing Plans and Cross Section - Bulkhead Shed
- *8. Cross Sections and Details - Pier Shed
- 9. Outshore Framing - Bulkhead Shed
- *10. Side Framing of Pier Shed
- 11. Inshore Elevation Framing
- 12. Outshore Elevation Framing
- *13. Stairway and Waiting Room Framing
- 14. Cargo Mast and Girder Details
- 15. Electrical Work
- *16. Water Supply and Heating

1916 Layout of Steel and Deck to receive Fan & Heater Etc/Under Contract 1519 - W. 55th St. Shed. 1 sheet.

WEST 55th STREET AND WEST 56th STREET PIERS
(Piers 95 and 96, North River)
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Pennsylvania Steel Company, Bridge & Construction Department

- 1916a Contract 5049. Freight Sheds (Bulkhead)/W. 55th St.
Improvements/Department of Docks & Ferries/Borough of
Manhattan/New York City. 35 sheets, 33 of which are available.
- 1916b Contract 5050. Freight Sheds (55th St.)/W. 55th St.
Improvements/Department of Docks & Ferries/Borough of
Manhattan/New York City. 48 sheets, 44 of which are available.

William J. Olvaney

- *n.d. Freight Shed/West 55th Street Improvement/Borough of Manhattan:
Heating System Installed by William J. Olvaney/£177 Christopher
St., N.Y.C. 2 sheets (plan and sections, latter photographed).

Later Improvements

Raisler Corporation

- 1953 Department of Marine & Aviation Contract No. 2833. Pier 96,
North River, Manhattan. 3 sheets, nos. 1 and 3 missing.

Drawings for Anticipated Demolition

City of New York, Department of Ports and Terminals

- *1985 Contract No. 3960. Demolition & Removal of Sheds of Piers 95
and 96, N.R./Borough of Manhattan. 11 sheets (nos. 4 and 9
photographed).

All these drawings are currently available for inspection, by appointment,
at offices of the Department of Ports, International Trade, and Commerce,
and will be on file for an indefinite period. Future acquisition of some
department drawings by the New York City Department of Records and Informa-
tion Services, Municipal Archives, is a possibility. Contact:

New York City Department of Ports, International Trade, and Commerce
Battery Maritime Building
New York, NY 10004
ATTN: Norman Berger, Director, Navigation Projects 212/806-6861

Historic Views

The construction, completed facilities, and use of the three other liner
terminals, built by the City of New York for the largest contemporary ships,
attracted considerable photographic attention from the Department of Docks,
newspapers, and publicists for the passenger ship companies. In contrast,
the smaller terminal including Piers 95 and 96, where construction involved
far less spectacular feats and where few prominent ships docked, received
far less photographic coverage. Searches of remaining Department of Docks
photographic collections, largely at Municipal Archives with other fragments
at the South Street Seaport Museum Library, have thus far yielded no useful
unpublished views; no relevant views appear in collections at the New York
Historical Society and the New York Public Library. The department pub-
lished one view of the Pier 97 piershed under construction in its Annual Re-
port for 1916, and another aerial view of Piers 96 and 97 in the report for
1920. One other municipal collection has a few exterior views:

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City of New York, Department of Records and Information Services

n.d. Borough President of Manhattan Collection, Collections of the Municipal Archives. Among hundreds of views taken c1932-38 of preparation, construction, and completion of the West Side Highway are seven showing the street facade of Piers 95-97 (three of which are reproduced for this documentation).

Contact: Municipal Archives
31 Chambers Street
New York, NY 10007
ATTN: Kenneth Cobb

One useful aerial view also appears in U.S. Army Corps of Engineers 1926. It should also be noted that published and unpublished views of ships in the Port of New York often have piers in the background, but to date review of the published sources listed below, and of unpublished collections held by South Street Seaport Museum and Mr. Frank Braynard, have yielded only one good view of Pier 95, reproduced as Photograph 30.

Interviews

Norman Berger, Director, Navigation Projects
Thaddeus Logan, Director, Port Development
New York City Department of Ports, International Trade, and Commerce
Battery Maritime Building
New York, NY 10004 212/806-6861

Interviewed April-May 1986. Both men are familiar with current structural and commercial conditions at New York City piers.

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(Piers 95 and 96, North River)
HAER No. NY-147 (Page 34)

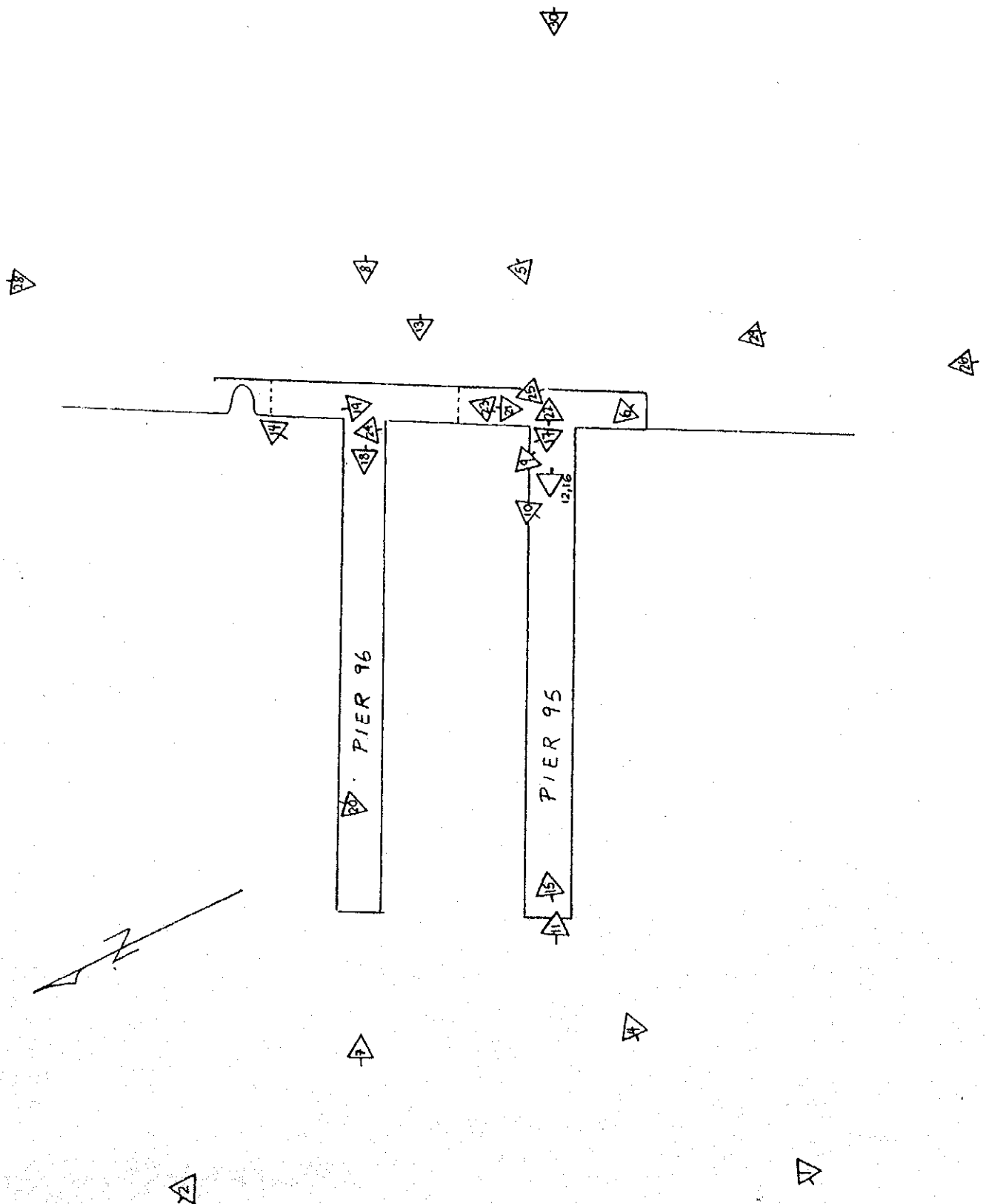
Likely Sources Not Yet Investigated

In addition to undiscovered photographs in newspapers and private collections, there may be additional information on original construction and later modifications in Contract Books of the Office of the Chief Engineer, Department of Docks and Ferries, 1912-46, partially abandoned in the former ferry waiting room of the Battery Maritime Building. Research on undocumented but important topics such as operations of shipping lines, stevedoring companies, and longshoremen would require extensive interviews and correspondence.

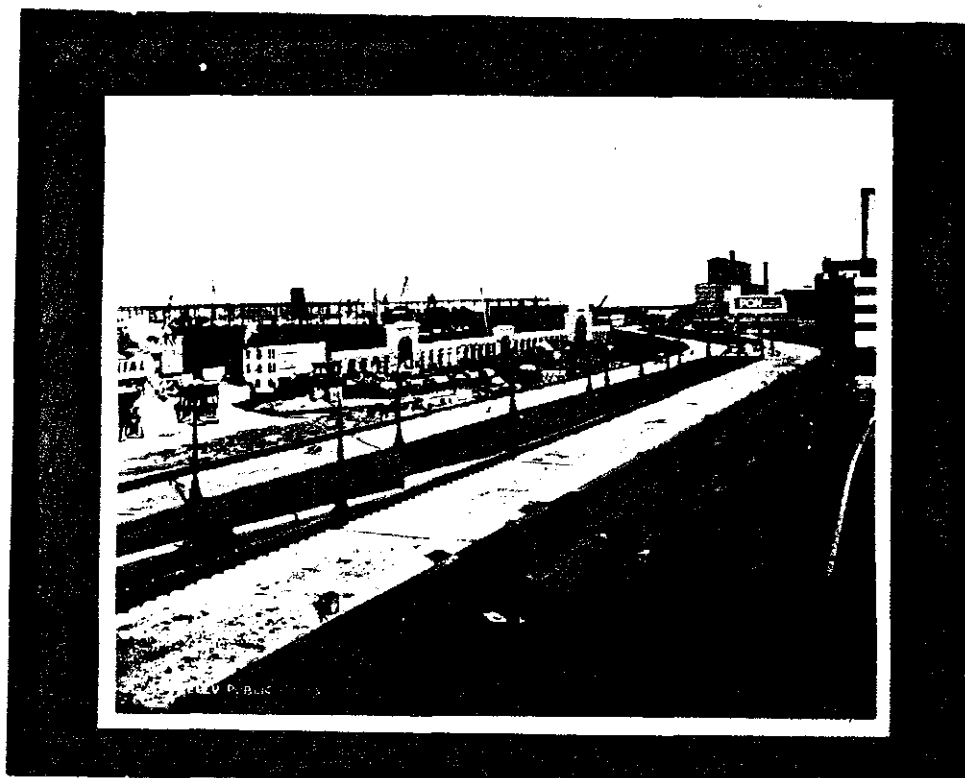
WEST 55th STREET AND WEST 56th STREET PIERS
 (Piers 95 and 96, North River)
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KEY TO PHOTOGRAPHS

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Photocopy of photograph (negative 1062-323, Borough President of
Manhattan Collection, City of New York Department of Records and
Information Services, Municipal Archives), December 5, 1936,
photographer unknown
VIEW NORTHWEST OF INSHORE FACADES; KUNGSHOLM AND CAMERONIA (II)
MOORED NORTH AND SOUTH OF PIER 97.



Photocopy of photograph (negative 680, Borough President of
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VIEW SOUTHWEST OF INSHORE FACADES



Photocopy of photograph (negative 1221-9, Borough President of
Manhattan Collection, City of New York Department of Records and
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photographer unknown
VIEW NORTHEAST OF INSHORE FACADES

